



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/440,928	11/16/1999	NOBUTOSHI AOKI	040301/0578	3624

7590 11/26/2001

RICHARD L SCHWAAB
FOLEY & LARDNER
WASHINGTON HARBOUR
3000 K STREET NW SUITE 500
WASHINGTON, DC 200075109

EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 11/26/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/440,928

Applicant(s)

AOKI ET AL.

Examiner

Steven H. Rao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 12-14, 22 and 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-11, 15-21, 23 and 25-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 November 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Response to Amendment

Election/Restrictions

Claims 12-14, 22 and 24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group II, there being no allowable generic or linking claim.

Election was made **without** traverse in Paper No. 3.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burghartz (U. S. Patent No. 5,583,059, herein after Burghartz).

With respect to claim 1, Burghartz describes a semiconductor integrated circuit including a insulated gate field effect transistor (Burghartz specifically mentions a BiCMOS and MOSFETs , however it is well known in the art to use MOSFET AND IGFET interchangeably- Muller and Kamins " Device Electronics for Integrated Circuits " Second Edition page 379) that includes a gate transistor (Burghartz fig. 1 , col. 3 line 56) having : a first region of at least a first group IV element (Fig. 2 A #7 col. 3 line 37) and a second group IV element different from the first (fig. 2 A # 4-5 col. 4 line 67) formed on a insulated gate film (fig. 2

A # 2, col. 3 line 33) a second region composed of first group IV element formed on the first region (fig. 2A # 6, col. 4 line 59).

With respect to claims 2 and 3, Burghartz describes a semiconductor integrated circuit including : wherein the first region has a composition ratio of the second group IV element gradually reduced with a distance from the insulated film (Burghartz col. 5 lines 4-8).(Cl. 2) ; step wise reduction (Fig. 3 C-E).

With respect to claim 4, Burghartz describes a semiconductor integrated circuit including : claim 4 recites the elements of claim 1 and further recites a silicide electrode formed in contact with the second region of the gate electrode (Fig. 3 E # 8 A, 7A , 10 A, col. 6 line 10-12) and being substantially free from the second group IV element (col. 5 line 49-56).

Claims 5-11, 15- 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burghartz (U. S. Patent No. 5,583,059, herein after Burghartz) as applied to claims 1-4 above and Herbots et al. (U.S. Patent No. 5,241,214, herein after Herbots).

With respect to claim 5, Burghartz describes a semiconductor integrated circuit including : the first and second group IV elements being silicon and germanium. (col. 4 line 56 and col. 5 line 16-17).

Burghatz does not specifically state the silicide electrode as being made up of CoSi_y or TiSi_y layers that are substantially free of Ge.

However, Herbots in its abstract describes MOSFETs wherein the device (gates) are formed of Group IV alloys (i.e. alloys of Titanium etc.) to grow a

reliable gate material (alloys) that do not decompose (Herbots col. 2 line 40-43).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Herbots' group Iv alloys as gate material instead of Burghartz's germanium material to grow a reliable gate material (alloys) that do not decompose (Herbots col. 2 line 40-43).

With respect to claim 6, Burghartz and Herbots describe a semiconductor integrated circuit including : a gate electrode having a thickness larger than a width of the depletion layer of the Si gate electrode (Burghartz col. 5 lines 1-10).

With respect to claim 7, Burghartz and Herbots describe a semiconductor integrated circuit including : wherein the composition ratio of Ge in the first region is at least 0.1 or larger. (Burghartz col. 4 line 67 and col. 5 line 6).

With respect to claims 8 and 9 , Burghartz and Herbots describe a semiconductor integrated circuit including : wherein Boron and Arsenic are used . (Burghartz col. 5 line 23- Arsenic, col. 5 line 67- Boron).

With respect to claim 10, Burghartz and Herbots describe a semiconductor integrated circuit including : wherein the group Iv element used is carbon instead of Germanium. See claim 5 above Herbots teaches the use of all group IV elements (alloys) interchangeably and as C is a group Iv compound, Herbots describes its use instead of germanium.

With respect to claim 11, Burghartz and Herbots describe a semiconductor integrated circuit including : wherein the elements of claims 1 and

4 are recited and further the second region is specified to be composed of multiple element compound consisting of first and second group elements and metal (i.e. alloys of group IV compounds- see Herbots description stated under claim 5 above).

With respect to claims 15 and 16, Burghartz and Herbots describe a semiconductor integrated circuit including : claim recites the elements of claims 1 and 4 and specifies the first and second group Iv region to be an epitaxial layer (Col. 4 line 55).(cl. 15) and an elevated source and drain (Burghartz fig. 1).

Claims 17-21 repeat the elements of claims 7-10, and are rejected at least for the reasons stated above.

With respect to claim 23, Burghartz and Herbots describe a semiconductor integrated circuit including : claim 23 repeats the elements of claims 15 and further recites an elevated electrode having a third region formed of regions similar to the first and second regions (See Herbots fig. 3 b).

With respect to claims 25-27, Burghartz and Herbots describe a semiconductor integrated circuit including : forming a thin layer is added between insulated film and the first region and composed of the first or second group Iv element (Herbots fig. 1 A # 16 between first region 14 and insulated gate film 18).

Any inquiry concerning this communication should be directed to Steven H. Rao at telephone number 703-306-5945.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703- 306-2794. The

fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703- 308-0956.

SK
10/19/2011



OLIK CHAUDHURI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800